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CHOICE OF SUPPLY CHAIN MODEL FOR E-COMMERCE

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INTRODUCTION

The globalized world, its vertiginous competitiveness and the speed to realize business have driven the development of electronic commerce, modifying the way to sell and buy products or services through Internet.

At present, the amount of institutions, companies and people that uses e-commerce is increasing. This fact is due to the incredible benefits that electronic commerce has. For instance, it allows to overcome boundaries of time and space and offer more personalized products to the customer among other.

International trade and freight transport are gaining an increasing prominence thanks to globalization and e-commerce. Both large and small companies look more and more to the outside, no longer as an opportunity but as a necessity. E-commerce is revolutionizing the way of buying since it was created and consequently, supply chain is being affected for this reason.

As I am interested on supply chain due to my Master's degree specialization and I often buy products or services on e-shops, these two reasons motivate me to implement a project of e-commerce and supply chain.

Relevance:

E-commerce has greatly evolved for forty years of existence and is still evolving continuously and supply chain is a key point.

Problem:

It does not exist a model to decide which kind of supply chain is better for a certain Business to Consumer (B2C) e-commerce due to the lack of information.

Investigatory object:

Process of analysis certain kinds of e-commerces and choose which type of supply chain model is the best one for each concrete area of supply chain.

Objective:

The main objective of the thesis is to present a proposition for choosing the right supply chain for a certain Business to Consumer (B2C) e-commerce.

To accomplish the main objective, it is necessary to carry out the following tasks:

- Analyse theoretical material in available information sources about e-commerces and supply chain.
- Analyse and study empirically the problem and its peculiarities.
- Create a proposition for choosing the right type of supply chain for different areas of a certain Business to Consumer (B2C) e-commerce.

Research method:

For the performance of the tasks mentioned formerly such research method was used: analysis of scientific literature, research synthesis and summaries, evaluation method.

Structure:

This work consists of three parts:

The first part analyses information about e-commerce, e-business and supply chain from the theoretical point of view. Definitions of these three main concepts and e-marketing and e-logistics are given. E-commerce models according to different classifications are described in a detailed way. E-commerce logistics solutions are examined. E-commerce efficiency is analysed and evaluation of e-commerce platforms is presented.

The second part consists of overview of e-commerce in the world, its penetration into the society and some statistics are given. Some Lithuanian e-commerces are analysed and evaluated.

In the third part, supply chain is analysed from two different points of view: experts and companies. A proposition for choosing which type of supply chain model is better for a certain area of a concrete e-commerce is presented and also described. Supply chain problems and strategies from three e-commerce companies are analysed.

In the end of this work conclusions are presented.

Volume of this thesis is 54 pages. There are 13 tables and 20 figures in this work.
Literature list consists of 35 information sources.

1. LITERATURE

In the next sections, we will talk about the definition of e-commerce and e-business and describe their characteristics. We will explain the different models of e-commerce, the e-commerce logistics solutions and the efficiency of this electronic commerce.

1.1. E-commerce

As a general definition, electronic commerce, also commonly known as e-commerce, consists of buying and selling goods or services between producers and costumers over electronic systems such as Internet. Thus, e-commerce is based on applying information and communication technologies to support this exchange of goods and services (Luiz Escoriza, 2014).



Figure 1. E-commerce definition (created by the author, source: Jaime H. Rodríguez, 2012)

But the concept of e-commerce is much broader and it is not only restricted to the Internet environment. In fact, many aspects of electronic commerce have been introduced in the last twenty-five years. Electronic commerce is a multidisciplinary concept that affects how interactions, negotiations with customers, payments and relationships with the supply chain are developed and which requires a new legal framework. E-commerce consists of intangible relationships between economic agents according to AFCEE (*Association Française pour le Commerce et les Échanges Électroniques*). Any transaction via telephone, Internet, banking networks, etc. and any payment method are involved in e-commerce (Soriano Ibáñez, 2016).

In most of e-commerce, the parts involved in the exchanging are people and companies. Nevertheless, a considerable percentage of electronic commerce consists of the acquisition of virtual products (software and some derivatives). For instance, access to the premium content of a website.

The advantages of electronic commerce are many: find a product at a lower price, open 24/7, cheaper costs and prices, geographical reach, possibility for the costumer to choose the product in a market according to their needs. But there are also some disadvantages such as it is more difficult to complain about a product due to distance between the supplier and the costumer. It is not possible to visualize the product as it can be shown in a typical shop and there may be electronic fraud too (de Oliveira Paegle, 2012; Rodríguez, 2012).

The commerce carried out electronically was introduced in the mid-sixties. Since this moment, it has been gaining more and more relevance due to their advantages, increasing penetration of high-speed and mobile Internet, the adoption of new consumer habits and safer payment methods. A wide variety of trades is done by Internet and consequently, they stimulate the creation and use of innovations such as electronic funds transfer, internet marketing, supply chain management, OnLine Transaction Processing (OLTP), Electronic Data Interchange (EDI), automated data collection systems and inventory management systems (Luiz Escoriza, 2014).

1.2. E-business

E-business can be defined as the set of new technologies and new business strategies used to develop online business. It consists of introducing communication technologies to realize the activities of a company. Also, it is a new way of managing efficiencies, innovation, speed and creating new value in a company (Fajardo Farje & Chuquiyauri Velásquez, 2009).

E-business is composed by four phases, which two of them forms e-commerce. As it is shown in Figure 2, these phases are information, interaction, transaction and integration (Barcelona Activa, 2015)

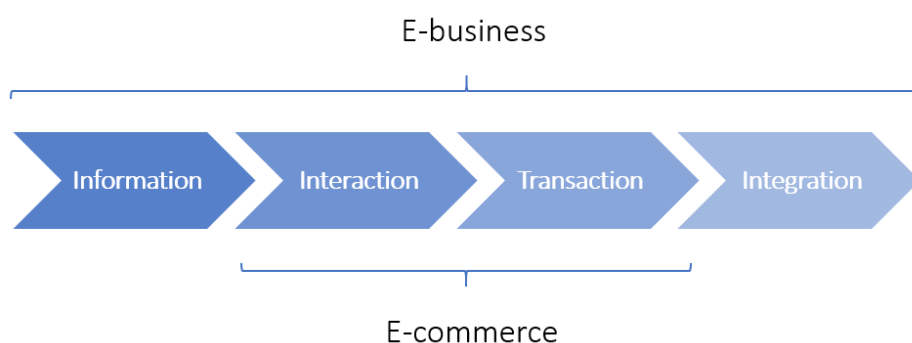


Figure 2. Phases of e-business (created by the author; source: Barcelona Activa, 2015)

The terms e-business and e-commerce are usually used as synonyms, but they are different and it is important to know their differences. The concept of e-business is referred to the impact of e-commerce in business processes. In other words, e-business includes e-commerce, but also covers internal processes such as production, inventory management, product development, risk management, strategy development, finance, human resources and knowledge management. E-commerce covers the processes that involve consumers, suppliers and business partners including activities such as sales, marketing, order taking, delivery, consumer services and customer loyalty management (Fajardo Farje & Chuquiyauri Velásquez, 2009; Piñedo Fajardo, 2011).

E-commerce strategy is narrower, simpler than other initiatives and it is more oriented to sales (Piñedo Fajardo, 2011):

- It is useful to analyse how to use the Internet to improve some areas (sales, marketing, purchases and consumer service objectives).
- It can focus on sales and orders taken on the Internet and it can be used to make measurements about growth or decrease in the profit curve.

On the other hand, e-business strategies have a greater reach and probably require strong structural changes in the organization. These are more challenging, offer more rewards (Piñedo Fajardo, 2011):

- They involve a total redesign of businesses: changing and reviewing all the processes in the company to capture the efficiencies that can provide the use of the technology in networks.
- They include earning opportunities. However, the focus is on costs and efficiency in operations.
- The use of an e-business system provides many important advantages for the consumer and for the company and they provide value added to the business.
- They imply a fourth category of integration: across the company, with a deep functional integration between new applications and redesigned business processes, and horizontally through a greater integration of ERP (Enterprise Resource Planning) or CRM (Customer Relationship Management) applications.

E-business makes appear different connotations: e-commerce (previously explained), e-logistics, e-marketing, e-marketplace, e-security, e-finance, e-trading, e-

procurement, e-learning, e-recruiting... The terms that are important for this thesis are explained in the following sections.

1.2.1. E-marketing

E-marketing refers to all the actions that are performed in digital media with the objective of finding, attracting, winning and retaining customers. The definition of e-marketing according to Cisco Systems is: “E-marketing is a general term for several activities that go beyond simply creating a website. E-marketing is oriented to online communications, using a direct dialogue with users in order to find potential customers and their use is based on an ideal medium for businesses to be done in a much simpler way” (Kont, 2011).

E-marketing has many advantages and some disadvantages as well. They are explained in the **¡Error! No se encuentra el origen de la referencia..**

Table 1. Advantages and disadvantages of e-marketing (created by the author; sources: Estrada, 2016; Tobon, 2009)

Advantages	Disadvantages
Availability of information, users can consult 24 hours per day any product or service	Users are quite saturated with Internet offers and they don't pay much attention
It has high impact on consumers compared to advertising outside the Internet and the probabilities of growth and expansion increase considerably	A slow/bad internet connection can cause a bad experience for the user, and this can origin a bad image to the company
It facilitates the exchange of banners and links with other sites and increases visits	Competence can detect easily the new publicity strategies and try to overcome constantly
Internet advertising campaigns have a low level of risk	Many people do not trust the Internet to make their purchases
Communication with the consumer is bidirectional and simple	There are many people that are not connected to Internet yet

It reports additional profits to those offered by the sale of the product or service offered on the site, through campaigns pay per click (PPC) and pay per action (PPA)	Publicity is only intended for network users. Sometimes, additional advertising on other media is also required
It allows to try new advertising ideas at little risk	
It allows to create and maintain the corporate image	
It is cheaper than advertising on other media	
It can be combined with other advertising media	

1.2.2. E-logistics

As a general definition, logistics is the part of the process of the supply chain that plans, conducts and control the flow cash costs, material storage, inventory in process and finished products, as well as related information from the origin point to the end consumption, to satisfy the customer requirements. Some things must be achieved: adequate products or services are in the right place, at the correct time and in the desired conditions (Ribas, 2016a).

E-logistics means the use of the Internet and new technologies to develop and implement solutions in logistics. E-logistics refers to logistics in an e-business environment, a broader concept involving the use of the Internet in the processes and activities of the enterprise: production, logistics, finance, commerce...

The most important aspects for e-customers related to e-logistics are delivering on time, compliance with the delivery schedule, complete deliveries, customized products, real-time information and possibility of returning products (Ramalhinho-Lourenço, 2005).

The global exponential increase in purchases through the Internet, obliges the sales and logistics companies to adapt their supply chains to a different type of operations from

those that were being carried out. There are many differences between e-logistics and the traditional one, they are the following:

- There are a lot of variable references associated with a catalogue and the products are associated with codes.
- It coexists several providers.
- In the online world, it is possible to find large amounts of related information and great ability to get orders.
- There are many work processes in the distribution centres.
- The greater the number of delivery points is, the more complicated the payment processes are.
- The inventory must be virtual and continuous because of the operation through product codes.
- Having a great capacity of logistics operative and capacity of stock forecasting is needed because e-commerce easily attracts customers.
- Online commerce works with smaller margins than in traditional trade.
- Great customization is allowed in online commerce.
- Payment process is more complex because it is carried out via online (being a non-presence method).

The specific properties of e-commerce and the differences between traditional commerce and e-commerce indicate some of the signs of identity that characterize the logistics problem in this commercial typology. In Table 2 some other differences are described, which will be very important to find the perfect solutions for e-commerce logistics (Observatorio Regional de la Sociedad de la Información, 2008).

Table 2. Differences between traditional logistics and e-logistics (created by the autor; source: Observatorio Regional de la Sociedad de la Información, 2008)

	Traditional logistics	E-logistics
Shipping type	Massive: truck, container, etc.	Package
Customer	Strategic	Unknown
Demand style	Push	Pull
Flow of goods	Unidirectional	Bidirectional
Destination points	Concentrated	Dispersed

Average order value	More than 1.100 €	Less than 110 €
Demand	Consistent and stable	Singular and very seasonal
Give information to:	Only one company	All the supply chain

In order to understand the adaptation of logistics processes to the online world, it is necessary to understand all the steps that take part in the distribution process and study how it coexists with the classical commerce. Also, it is essential to innovate in communicative processes and provide added value to the products offered to e-shoppers and be able to retain them.

1.3. E-commerce models

In e-commerce, the main actors that intervene on it are: companies, consumers and government. Sometimes, employees and mobiles can also participate in the electronic commerce.

There are some classification criteria for electronic commerce and for this thesis, models will be classified by three types:

- Depending on the participation of the subjects and the relationship established and the economic factor that intervene, there are different possibilities of models. All of them are shown in Figure 3.

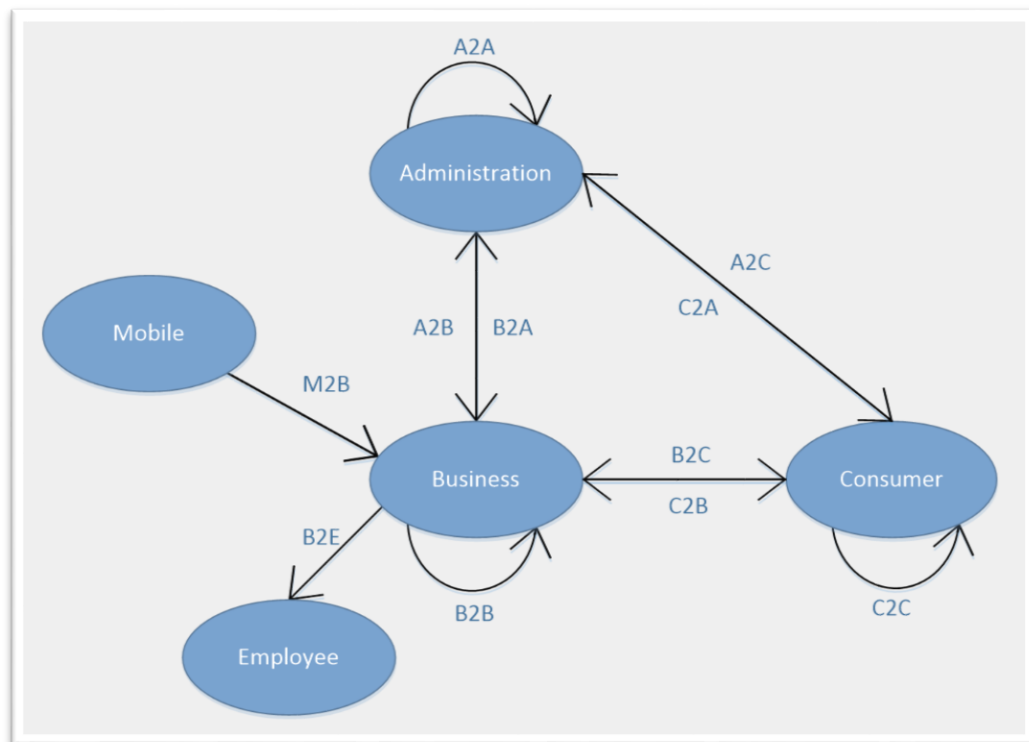


Figure 3. E-commerce models (created by the author, source: Soriano Ibáñez, 2016))

And now, all the models of e-commerce will be explained, describing the advantages and disadvantages of them and giving some examples when it is needed.

Administration to Administration (A2A)

This is the relationship between public administrations. It is established in countries with different public administrations (state, autonomous regions and municipal). This type of relation is not always e-commerce itself, but the wider the range of citizens using telecommunications networks, the greater the development of this e-commerce model (Soriano Ibáñez, 2016).

Administration to Business (A2B)

In this model, the government or public administration and the companies are the ones who take part in the transaction. The purposes of this model are: simplification, exchange and standardization of forms, applications and offers. For instance, tendering for public contracts and provisions for the different types of taxes on audits and consultancies (Lipinski, 2012).

Administration to Consumer (A2C)

This kind of e-commerce is the one that deals with the relation between a citizen and the Administration. The costumer is the citizen thus, this e-commerce occurs when the citizen can perform procedures through a portal because the Administration allows them to do it. So, this model permits a direct communication between the costumers (citizens) and the government.

Administration to consumer is a type of commerce because the user pays for the process and it is possible to access to the information at any time. The main advantages of this system are the time savings, speed and security of procedures, lower costs and electronic backup. For instance, in Spain, it is possible to justify and deliver the incomes by Internet (Pierce, 2014; Soriano Ibáñez, 2016).

Consumer to Administration (C2A)

This model is similar to the one previously mentioned but in this case, the costumer is the Administration. Some examples of this e-commerce are e-democracy, e-health and

information about public services. If consumers use these services, they can post concerns, request information or feedback about their local government (eB, 2012).

Business to Administration (B2A)

In this model, the Administration is usually the customer. Public administrations not only act as regulators and promoters of e-commerce, but also as users such as in public procurement procedures or acquisitions for the Administration.

This type of e-commerce covers all transactions between companies and government organizations and can also be called e-administration (Comercio Electrónico Región de Murcia, 2015; Soriano Ibáñez, 2016).

Business to Business (B2B)

In this case, any consumer intervenes on the buying and selling. It refers to commercial transactions between different companies such as between a wholesaler and a retailer or an autonomous, or a manufacturer and a wholesaler. The B2B model encourage online businesses and promote products export and import.

In B2B transactions there are many raw materials and subcomponents involved in a typical supply chain. Nevertheless, in B2C model, there is just one transaction (the sale of the finished product to the final costumer). Consequently, this is the reason why the volume of B2B transactions is much higher than the volume in B2C model and any other transaction.

The relations established between both participants are generally stable. It means that the costs of installing these systems are justified. It is possible to consider B2B model as an evolution of business between companies as they use the opportunities provided by globalization, interaction and cost reduction of modern media.

Companies must have experience in the market to being able to participate in this model. It uses website with the aim to interchange services and products between enterprises that pretend to reduce costs. These websites usually have restricted access and companies needs to have permissions to conduct commercial transactions. B2B model allows to reduce costs in some process such as purchasing, sale, billing and information exchange (Pierce, 2014; Soriano Ibáñez, 2016; Telepieza, 2015).

Business to Consumer (B2C)

This model of e-commerce, which is the most common one, considers the relationships between a buyer and a company over a telecommunications network. The basic idea of this e-commerce model is to sell the product online to the customers and payment is mostly done through credit cards or payment gateways such as PayPal.

One advantage of this model is the possibility of access to the online shop at any time from any electronic device and this makes purchasing easier and more comfortable. Also, offers and prices are constantly updated for the convenience of the customer. Another benefit is that customer support can be provided directly through different forms (live chat, social networks, e-mail, Skype...). The forecasts turnovers are optimistic even though the current volume of business is not as high as might be expected. The possibility for companies to offer their products at relatively low costs and to such a high audience potential causes that supply increases daily. Moreover, there are some products which are in digital support such as music, books, videos, software, etc. that eliminate physical barriers because the whole transaction can be done on the Net, so the ease of online sale seems to be guaranteed.

Despite these advantages, B2C development is slower than it would seem to be due to the lack of knowledge of users about security mechanisms, the lack of security in some implementations of online shops and the problem of products piracy in digital support.

Amazon is the company of reference in this e-commerce model, because it is one of the most important companies worldwide in selling books and discs through its portal (Pierce, 2014; Soriano Ibáñez, 2016; Telepieza, 2015).

Consumer to Business (C2B)

This curious model is similar to B2C but in this case the customer is the company itself. The consumer is the one who origins the transaction and one example of them can be offering houses and flats for renting (Telepieza, 2015).

Consumer to Consumer (C2C)

This e-commerce model relates different users (consumers) for the sale of products. C2C refers to the transaction of selling a product when somebody doesn't use it any more.

This person sells it to another consumer by using e-commerce. Some of the advantages of this model are the following: reuse of products and purchasing at lower prices and with unique offers.

There are different examples of this model. The first one would be the auction websites that act as intermediaries with the purpose to put in contact different users with complementary needs, in other words, the websites are used to match consumers. This third party provides the online platform where transactions are carried out. Another case would be the Peer to Peer (P2P) applications, which allow sharing information between users. The most important example of company based on C2C model is eBay; it is, without doubt, the leader in turnover of this model (Pierce, 2014; Soriano Ibáñez, 2016; Telepieza, 2015).

Mobile to Business (M2B)

M2B or also known as Mobile commerce (m-commerce) uses devices such as smartphones, mobile phones, tablets or PDA (Personal Digital Assistant) to carry out the online transactions. They allow the user to connect with the website with the aim to buy the products. The most typical ones are games, images, videos, music...

Currently, to foment users to use this model, web designers are trying to optimize all this kind of websites. Consequently, it is easily to view e-commerce websites on mobile phones. Sales done by M2B will be the future of many enterprises on a commercial level due to the proliferation of such devices (Eyerys, 2017; Telepieza, 2015).

Business to Employee (B2E)

This relationship is focused on the company and its employees. This commerce is an online shop with attractive offers that the company provides to the employees. They have an exclusive use of this platform. B2E is a way to promote an internal e-commerce with unique opportunities for those who work in the company.

This model tries to maximize employees' efficiency and performance. Thus, this is an incentive to improve the job performance and generates competition among employees. It also helps to motivate them and foster loyalty between the employees and the company. Consequently, the relationship between the company and its employees can

become better and it means an increase of the final productivity (Comercio Electrónico Región de Murcia, 2015; Pierce, 2014).

- Depending on the technological environment where the transaction is carried out:

Open e-commerce

This kind of e-commerce takes place in open telecommunication networks such as Internet (Nieto Melgarejo, 2015).

Closed e-commerce

This e-commerce takes place in closed networks where only those who have a relevant qualification can operate. For instance, Electronic Data Interchange (EDI) (Nieto Melgarejo, 2015).

- Depending on the media that is used:

Indirect e-commerce or offline e-commerce

Indirect e-commerce is the one used for the acquisition of tangible goods, being clear examples of this modality the transactions of those contained in a material support. For this reason, these goods must be sent using traditional distribution channels. However, the transactions are carried out electronically (Nieto Melgarejo, 2015).

Direct e-commerce or online e-commerce

The transaction of this type of e-commerce is composed of intangible goods. The order, payment and delivery are produced online. Some examples of this e-commerce are music and software. The delivery of the goods acquired is done through the network, so it occurs without physical support. Online e-commerce can be completed only through the network, using just electronic media (Nieto Melgarejo, 2015).

1.4. E-commerce logistics solutions

Logistics is a fundamental element of B2C model and a good logistics system is a competitive and decisive key point for any company that sells its products on the Internet. Sometimes, sales processes are slowed down due to some distribution problems, so online companies must have a good e-logistics system.

The needs and logistical solutions for e-commerce, in particular regarding the delivery of tangible goods in the home or local agreed with the consumer, present new problems and challenges to all companies that sell their products on Internet or to transport enterprises and logistics operators.

Some activities are affected in a logistics system due to the introduction of the new Internet distribution channel:

- Inventory management and product availability:

Some solutions will certainly allow a better inventory management: market studies about customers' profile, real-time information on inventories in stock, good communication and integration among all the supply chain, an excellent system of sales forecasts.

- Storehouse management and preparation of orders:

The different operations in a warehouse will have to adapt to the new requirements of e-commerce:

- Reception: the entrance of products will be fast and will be registered in the computer system.
- Storage: the location of the products should follow an intelligent and flexible system that can adapt quickly to changes in the market. Also, it must be diverse to allow fast movements within the storehouse.
- Order preparation: the enterprises that want to carry out the orders preparation in their storehouses will need to have a specific area for this operation, design an efficient system of preparation, automate some operations and hire specialized personnel. All these processes must be integrated with the company's information system.
- Ordering: time factor is important because the multiple orders must be prepared to make a quick exit.
- Return management: a quick and efficient response from the warehouse must be given with each return. It requires checking the condition of the

item, reconditioning it or re-entering it in the warehouse. So, to achieve this, it will be useful to enable a zone for defective products, manage the relocation operations of the products returned in good condition, and manage the re-delivery should the customer so request.

- Sales forecasts:

Sales forecasts are the input for the planning of purchases, production, capacities, storage, transportation, human resources, or all the resources of the company. Online sales, which are more difficult to predict than traditional sales, represent a small percentage of total sales of a company. For this reason, the problem of obtaining reliable forecasts has not yet been too relevant. But in a next future, this will increase and sales forecasts will be necessary. Statistical techniques, information systems and management methods will be essential in the development of these forecasting systems, and the possibility of obtaining real-time information and the application of statistical solutions will help to make better forecasts.

- Information management:

It would be ideal to have information in real time, for example quantity of the products in stock in the different warehouses of a company, situation of the orders, identification of products and orders, etc.

Many technological solutions already exist in the market such as the bar code, the tracking and tracing systems offered by many logistics operators and express parcel companies, the connection of these tracking systems to the information systems of a company, etc. The large amount of information that e-commerce can generate needs management and identification models to obtain useful information for the company and its customers.

- Transport management and delivery routes:

At present, it exists many computer solutions that can make improve the transport management and the optimization of the distribution routes of the orders. For instance, the company SEARS (chain of department stores) with the collaboration of ESRI

(software developer for Geographic Information Systems) created a software optimising the delivery routes and it allowed to save \$42 million per year.

- Outsourcing of logistics:

Outsourcing of logistics is nowadays an option widely used by enterprises and logistics operators are aware of this need. Some time ago, they were not prepared for e-logistics, but they had more knowledge, knowledge, infrastructure and logistics experience than other companies to adapt to this new environment. They were developing projects and new departments dedicated to the delivery of Internet sales. Thus, it is possible to say that they are prepared for the e-logistics (Ramalhinho-Lourenço, 2005).

Third Party Logistics (3PL) is the outsourcing of logistics and transport to other companies. It is typical to outsource more than one activity including storage, warehousing and transportation. According to a survey answered by some companies, Figure 4 shows the results of the percentages of activities outsourced according to a study on this field.

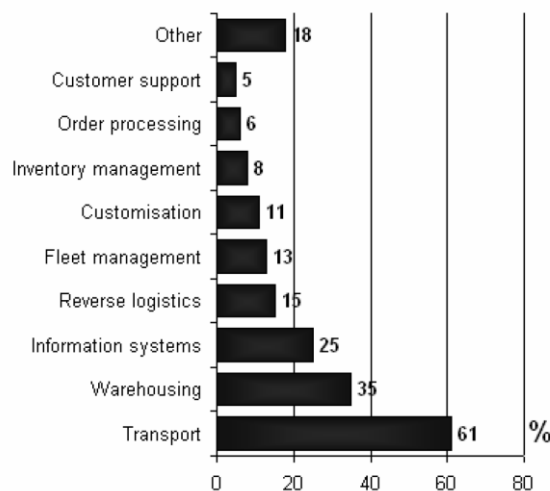


Figure 4. Level of outsourcing logistics functions (source: Vasiliasuskas & Jakubauskas, 2007)

Supply chain requirements are increasing due to the evolution of the markets and 3PL operators have provided greater value added services and progressively incorporated new technologies. This kind of outsourcing can also offer reverse logistics, traceability, inventory management, etc.

Although Third Party Logistics has many advantages, it seems that they are not enough. E-commerce boom, markets evolutions and globalization are shaping modern

logistics and these make supply chain more complex to face much more volatile and competitive markets. Consequently, Fourth Party Logistics (4PL) was born as a new solution. Certainly, it is a 3PL development and the 4PL company provides planning, information technology integration, transport planning, order tracking and tracing, logistics consulting, application solution and financial services. After 4PL, it appeared Fifth Party Logistics (5PL) solutions which focus on providing overall logistics solutions for the whole supply chain (Vasiliauskas & Jakubauskas, 2007).

At present, it's the turn of the Internet to revolutionize the world. There will be no logistics operation that in any way or other has no relation to this global exchange space. The Internet has managed to transform logistics from start to finish (Ramalhinho-Lourenço, 2005).

1.5. E-commerce efficiency

E-commerce efficiency is a very important factor that can assist a company in its strategies to become successful. Many aspects are important to achieve a good efficiency and quality in a certain type of e-commerce, so first, websites must be focused in some factors when it is designated for an e-commerce. Figure 5 shows these factors: performance, usability, design and maintenance, web technology employed, user transaction, content updates and security (Abd El-Aleem, Abd El-Wahed, Ismail, & Torkey, 2007).

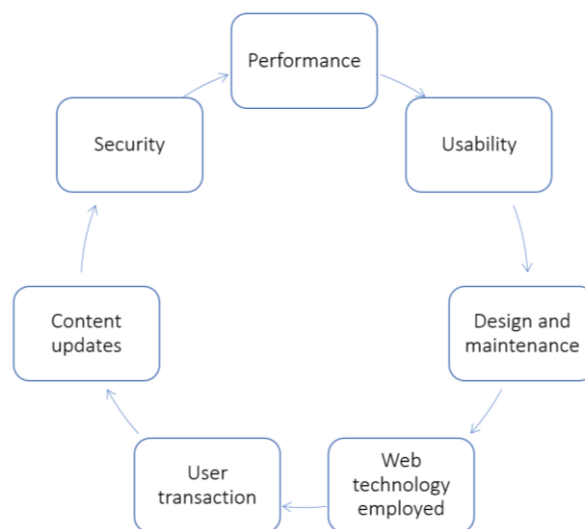


Figure 5. Factors to achieve a good quality and efficiency of e-commerce websites (created by the author; source: Abd El-Aleem et al., 2007)

It exists an index to reflect perceptions of a country's logistics based on efficiency of customs clearance process, related infrastructure, quality of trade and transport and ease and quality of logistics service. This index is called Logistics Performance Index (LPI). This index was created by The World Bank thanks to a worldwide survey of operators. It helps countries identify the opportunities and challenges they face in their trade logistics performance. It also permits to know what actions should they do to improve logistics system (Arvis et al., 2014; Ecommerce Foundation, 2016).

Every two years, The World Bank elaborates a broad report that includes a very extended rank of countries according to its LPI. The top 10 economies of the world according to its LPI score are shown in Table 3. In 2016, Germany occupied the first position in the rank with a score of 4,23. This country was also the first one in 2014 but with a lower score. The rank has considerably changed since 2014. In the case of Lithuania, in 2014 they were in the 46th position and then, in 2016, they reached the 29th position with a 3,63 score. It means that efficiency in logistics has improved significantly (Arvis et al., 2014, 2016; Ecommerce Foundation, 2016).

Table 3. Top 10 economies according to LPI (created by the author; source: (Arvis et al., 2014, 2016)

Economy	LPI 2016 rank	LPI 2016 score	LPI 2014 rank	LPI 2014 score
Germany	1	4,23	1	4,12
Luxembourg	2	4,22	8	3,95
Sweden	3	4,20	6	3,96
Netherlands	4	4,19	2	4,05
Singapore	5	4,14	5	4,00
Belgium	6	4,11	3	4,04
Austria	7	4,10	22	3,65
United Kingdom	8	4,07	4	4,01
Hong Kong SAR, China	9	4,07	15	3,83
United States	10	3,99	9	3,92
Lithuania	29	3,63	46	3,18

The concept of e-logistics is the set of logistic operations and information, designed and adapted to optimally meet the operational needs imposed by the online shopping model and whose goal is consumer satisfaction with the delivery of his product in time and form. Therefore, it is important to consider these aspects:

- Meeting the logistics needs of companies and logistics operators in B2C: information, immediacy and reliability in delivery.
- Ability to generate logistic information (data) from the moment purchases are made through the internet.
- Integration of information from the purchase by the consumer throughout the supply chain.
- Maximum interaction between consumer and logistics through key consumer information.
- Analysis of the consumer data that affect the logistics to improve the logistics processes and therefore, increase the satisfaction for the purchases.

The configuration of an optimal e-logistics is a challenge for all enterprises that take the B2C path.

E-commerce implementation offers to the companies the possibility of introducing a new distribution channel which has significant advantages over traditional channels since the use of telecommunications technologies increases and optimizes the efficiency of business activities. So, e-commerce impact would determine the business efficiency of a company. For this reason, e-commerce decisions implementations, costs, competitiveness, optimisation, process automation, etc. are crucial to optimize the efficiency.

(Baršauskas, Šarapovas, & Cvilikas, 2008) present two different kinds of measuring business efficiency according to two authors:

- Christensen and Hansen (1996) considers that efficiency should take into account the relation between production and cost:

$$\text{Efficiency} = \frac{\text{Any expression of created value}}{\text{Any expression of experienced cost}} = \frac{\text{Production}}{\text{Cost}} \quad (1)$$

- The Hong Kong Productivity Council (2004) stated that efficiency is associated with the absolute difference between output and input (relationship between the output and input with the accent of value-added):

$$\text{Efficiency} = \frac{\text{Output} - \text{Input}}{\text{Input}} + 1 = \frac{\text{Value} - \text{added}}{\text{Input}} + 1 \quad (2)$$

Finally, it is necessary that enterprises design e-commerce strategies that contribute to the improvement of traditional activities, use new intermediaries and adopt new ways of creating value. These objectives allow to achieve efficiency and come to be achieved by reducing costs, improving quality perceived by customers.

1.5.1. Evaluation of e-commerce platforms

Having a good e-commerce platform is a key point to succeed in the e-marketplace. The capabilities of these platforms can mean the success or the failure of the e-commerce. For this reason, some considerations must be followed to achieve an efficient e-commerce platform. In 2011, the most important technical considerations for evaluating e-commerce platforms were established by Oracle and they are shown in Table 4 (Oracle, 2011).

Table 4. Considerations for evaluation e-commerce platforms (created by the author; source: Oracle, 2011)

Consideration		What is the consideration?
1	Scalability	Will the site perform efficiently through traffic peaks and valleys?
2	Product catalogue	Will today's catalogue schema meet tomorrow's demands?
3	Business User Control	Will my application directly empower my merchandisers, marketing managers, and other business owners?
4	Search	How easily can customers find what they want, and how easily can I promote the products I want to push based on customer searches?
5	Agility	How easily can I implement business requests to monitor and respond to an individual Web visitor's behaviour?

6	Reporting and analytics	Do I have all the features I need to understand my online business?
7	Standards	Is the application built on a standards-based platform?
8	Integration	How easily can the application integrate with my other systems?
9	Interoperability	Does the application function within a service-oriented architecture?
10	Synergy	Will the application support business models beyond B2C e-commerce?

A research made by University of Vilnius identified the most significant e-commerce quality criteria based on e-costumers' survey, e-commerce experts' survey and scientific literature. They are reflected and summarized in the Table 5 (Guseva, 2011).

Table 5. Summary of e-commerce quality criteria (source: Guseva, 2011)

	E-commerce quality criteria indicated:		
	in literature	by experts	by e-customers
Ordering stage	Usability, technical quality, content relevance, perception	E-shop quality	Navigation, technical aspect of e-shop, reviews of other e-customers
	–	Number of purchases through e-shop	–
	Loyalty, localization	E-offer quality	E-offer, localization of e-shop
	–	–	Online support during e-shopping
Payment stage	–	Number of payment alternatives	Payment alternatives
	Safety of transactions and personal data	Certificate of payment safety	Payment safety
	–	Clearness of payment system	Clearness of payment system
	–	–	Online support when paying
Delivery stage	Delivery	Delivery term	Delivery term
	–	Delivery delay term	–
	–	–	Delivery price
	–	Delivery modes	Delivery modes
	Client relation on delivery	Client support on delivery	Client support on delivery
Post-purchase stage	–	Dislocation of post-purchase service points	–
	Warranty	Warranty	Warranty term
	Conditions of product returning	–	Duration of money refund; Duration of period when it is possible to return a product; Duration of complaint examination
	Client relation after purchase	Client support after purchase	Client support after purchase

1.6. Supply chain

Supply chain emphasizes the interactions of logistics that take place between marketing, logistics and production functions in a company and the interactions between companies within the flow channel. The collaboration and the coordination between the elements of the supply chain allow to improve customer service and costs (Ribas, 2016a).

The competitive strategy of an enterprise is defined based on what gives priority to the customer: delivery time, quality, variety and price of the product. The strategy followed in the design on the supply chain must be aligned with the company's strategy. Therefore, there are three steps that must be followed to achieve the strategic adjustment (Ribas, 2016a):

1. Understand the customer and the uncertainty of the supply chain.
2. Understand the capabilities of the supply chain.
3. Achieve a strategic adjustment.

Depending on the strategy followed on the supply chain, it exists two types of supply chain: efficient supply chains and responsive supply chains. Efficient supply chains are oriented to costs and responsive supply chains are focused on the service. The characteristics of them are described in Table 6 (Fisher, 1997; Ribas, 2016).

Table 6. Characteristics of lean and responsive supply chain (created by the author; sources: Fisher, 1997; Ribas, 2016)

	Efficient supply chain	Responsive supply chain
Main objective	Supply the predictable demand efficiently at the lowest possible cost	Respond quickly to unpredictable demand in order to minimize stockouts, forced markdowns, and obsolete inventory
Price strategy	Low contribution margins	High contribution margins
Manufacturing strategy	Low costs thanks to high average utilization rate of installations	Flexible capacity to respond to the uncertainty of demand
Stock strategy	Generate high returns and minimize inventory throughout the supply chain	Stock to respond to uncertainty

Delivery time strategy	Shorten lead time as long as it doesn't increase cost	Very low although it involves a high cost
Suppliers strategy	Select primarily for quality and cost	Select primarily for speed, trust, flexibility, and quality
Product-design strategy	Maximize performance and minimize cost	Use modular design in order to postpone product differentiation for as long as possible

Supply chain configuration depends, among other factors, on the characteristics of the products offered by the organization. Products can be divided into functional and innovative products. The functional ones are products which satisfy basic needs of the consumer and which do not change much over time, having stable and predictable levels of demand and long life cycles. This stability generates competition, which in turn leads to low profit margins. On the other hand, through innovation and technology, innovative products become popular at certain times and generate, for the consumer, an additional attraction to buy them. This leads to an increase in profit margins. However, the demand for these products is unpredictable, the life cycle is short and they suffer from imitations from other companies, which reduce or even eliminate the original competitive edge, making the company live in cycles of innovations (Mendes dos Reis, de Oliveira Costa Neto, Alves Fusco, & Teixeira Machado, 2014). The main differences of these two products are explained in the following Table 7.

Table 7. Characteristics of functional and innovative products (created by the author; sources: Fisher, 1997; Ribas, 2016)

Characteristic	Functional Product	Innovative product
Demand	Predictable and stable	Unpredictable and uncertain
Product life cycle	Long (more than 2 years)	Short (between 3 months to 1 year)
Contribution margin*	Low (5% - 20%)	High (20% - 60%)

Average margin of error in the forecast at the time production is committed error	Low (10%)	High (40% - 100%)
Product Variety	Low (10 - 20 variants per category)	High (often millions of variants per category)
Average stockout rate	1% - 2%	10% - 40%
Average forced end-of-season markdown as percentage of full price	0%	10% to 25%
Lead time required for made-to-order products	6 months to 1 year	1 day to 2 weeks
* The contribution margin equals price minus variable cost divided by price and is expressed as a percentage.		

Companies first have to determine if their products are functional or innovative to be sure that they are taking the right approach. Then, it is necessary to decide if their company's supply chain is responsive or efficient to the market. By using the matrix (**Table 8**) to plot the nature of the demand for each of their product families and its supply chain priorities, the company can realize whether the process they use for supplying products is well match to the product type. It is recommended to follow this matrix because companies that have either an innovative product with an efficient supply chain or a functional product with a responsive supply chain tend to be the ones with problems (Fisher, 1997; Ribas, 2016).

Table 8. Type of product vs type of supply chain (created by the author; sources: Fisher, 1997; Ribas, 2016)

	Functional Product	Innovative product
Efficient supply chain	✓	
Responsive supply chain		✓

Before starting an e-commerce, it is recommended to think about some important features. First, it is crucial to decide if the company will manufacture the product or resell items. Second, choose between keeping an inventory or not and how much control over

the packaging and the shipping the company wants. After that, it is also necessary think about how critical is price control to the business at this stage. Finally, consider what volumes the company will deal with.

Many e-commerce retailers use drop shipping to satisfy demand. It is a variant of e-commerce in which traditional logistics has been transformed: the online store is responsible for managing customer service, billing, and database generation, while the wholesale company stores, packages and send the articles to the online trade. The advantages of drop shipping are keeping stock no longer necessary, lower wholesale prices, no upfront investment in stock, less time devoted to inventory and delivery and extended range of products without investment or risk (Khurana, 2017; Quondos, 2015).

2. IMPACT OF E-COMMERCE

In the next sections, we will talk about how e-commerce is extended through the world showing some statistics and some Lithuanian e-commerces are evaluated.

2.1. E-commerce in numbers

Electronic commerce not only includes the electronic purchase and sale of goods, information or services, but also the use of the Network for previous or later activities such as advertising, searching for product information, suppliers, customer service before and after the sale, etc. E-commerce development will be possible if an atmosphere of trust is created for all participants.

Currently, e-commerce is very present among society. 26% of people aged over 15 frequently use the Internet to exchange services and goods. Internet penetration all over the world, shown in Figure 6, is a very important factor to consider because it allows electronic commerce to be carried out. In most countries of America, Europe and Oceania and some countries of Asia, this penetration is more than 50%. However, in Africa there are many countries with up to 10% of Internet penetration (Ecommerce Foundation, 2016).

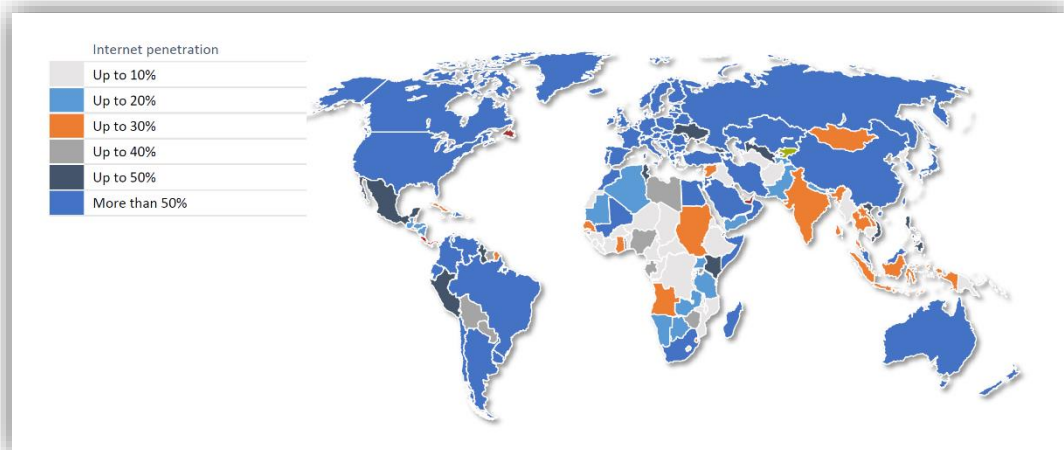


Figure 6. Internet penetration all over the world (source: Ecommerce Foundation, 2016)

B2C model of e-commerce is the most common one and best known for all the people. The global turnover due to B2C e-commerce has been increasing year after year. Asia-Pacific was the strongest Business to Consumer e-commerce region in the world in 2015, with a turnover of \$1,056.8bn. The second one was North America (\$644bn) followed by Europe whose turnover was of \$505.1bn. In the following chart (Figure 7),

it is possible to appreciate the different turnover contribution to B2C e-commerce of the worlds (Ecommerce Foundation, 2016).

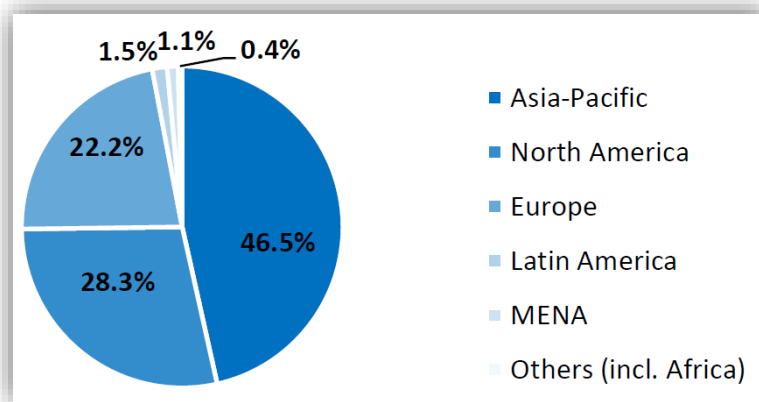


Figure 7. Contribution to B2C e-commerce turnover (source: Ecommerce Foundation, 2016)

According to Europe, as it can be seen in Figure 8, 274 million people of Europe (without including people aged between 0 and 14) buys products or services from the Internet. The total population of Europe is about 817 million, so it means that almost the 40% of Europeans are e-shoppers (an individual who regularly bought or ordered goods or services through the Internet). These data are from 2014 (Ecommerce Foundation, 2015).



Figure 8. Estimate of e-shoppers in Europe in 2014 (source: Ecommerce Foundation, 2015)

Figure 9 shows a map of European countries separated by colours and their different turnovers. UK, Germany France Netherlands and Switzerland were the five countries that that had the highest turnovers in 2014. Russia, Spain, Italy and Poland are the top emerging countries of Europe (Ecommerce Foundation, 2015).

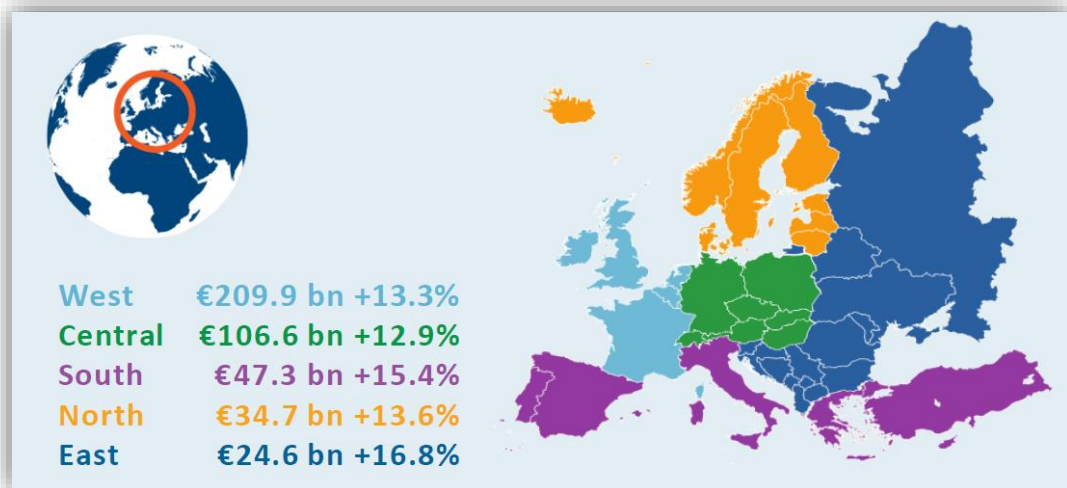


Figure 9. Turnovers of groups of European countries (source: Ecommerce Foundation, 2015)

Since electronic commerce appeared, it has evolving considerably and nowadays, it is still progressing continuously. Also, it is important to highlight that some entrepreneurs took advantage of e-commerce benefits and could create new business models. As Figure 10 shows, from 2008 to 2015, there was an increase of the percentage (7%) of enterprises that had e-sales in the European Union. The enterprises' turnover due to e-sales increased by 4% (Eurostat, 2016).

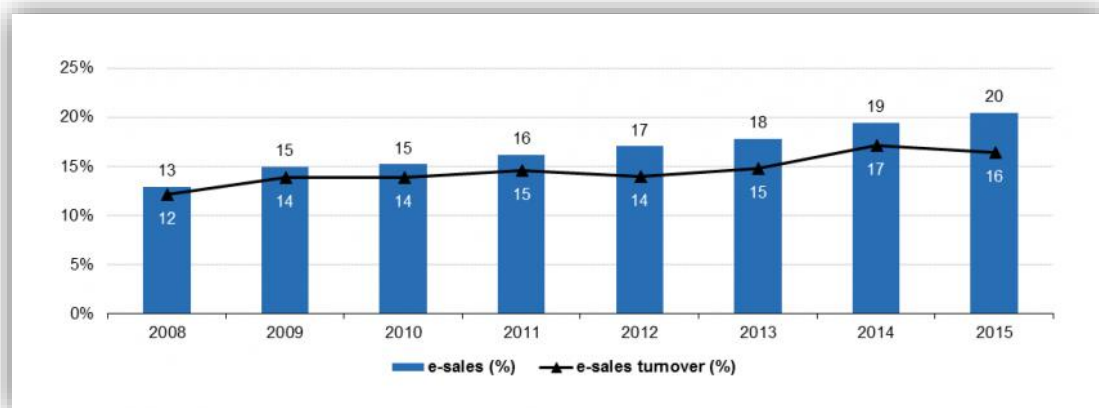


Figure 10. Increase of e-sales (%) and e-sales turnover (%) from 2008 to 2015 (source: Eurostat, 2016)

The percentage of e-sales carried out of the total of sales changes depending on the country. Each percentage for every country of the European Union is shown in Figure 11. For instance, Spain and Lithuania have similar results: 20% and 19%, respectively (Eurostat, 2016).

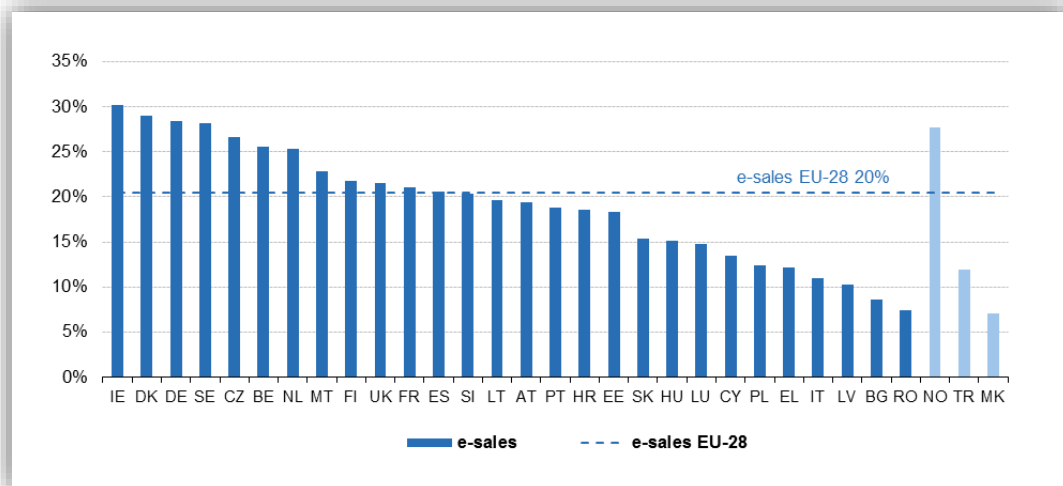


Figure 11. E-sales (%) per country of European Union (source: Eurostat, 2016)

Lithuania's population exists of 2,9 million people, of which 72% uses the Internet. 650 thousand of these Internet users are e-shoppers. The online shoppers on average spend 630 € per year. E-commerce turnover means 1,13% of the total turnover of the country (Ecommerce Foundation, 2015).

2.2. Evaluation of Lithuanian e-commerces

As the thesis is made in Lithuania, this country is a case of study in this project. Hence, the first questionnaire was done to evaluate Lithuanian e-commerces. It is addressed to Lithuanian people or people who just live in Lithuania and have information about Lithuanian e-commerces. Consequently, they can evaluate these e-commerces and onwards, we refer to these people as "Lithuanian people", "Lithuanians" or just "respondents" to make it shorter. The features of this questionnaire are listed below:

- It is important to know what motivates somebody to buy through Internet and which barriers back out of buying.
- Seven e-shops (selling household appliances and electronics) were chosen for evaluation: www.pigu.lt, www.neriba.lt, www.butis.lt, www.vektrona.lt, www.preka.lt, www.troliai.lt and www.varle.lt.
- A list of ten criteria for evaluating website quality, logistics and others were engaged.

Many Lithuanians filled in the questionnaire and this allowed to extract some conclusions of Lithuanian e-commerces. The majority of people examined are between 20 and 30 years old, exactly 90,41%.

The first important question to consider is related to which Lithuanian e-commerces does the population of the country knows. Pigu and Varle are the most popular e-commerces in Lithuania as 94,52% of the people surveyed answered that they know Pigu and 91,78% of them know Varle. Neriba is the third most popular with a percentage of 15,07%. Vektrona and Troliai are a bit unknown for the population and 0% of the surveyed people doesn't know Preka either Buitis. The following **Figure 12** shows all these results. The big differences of results can be caused by many factors. Pigu and Varle are much better known by consumers than the other e-shops and marketing campaigns can be the cause of this fact.

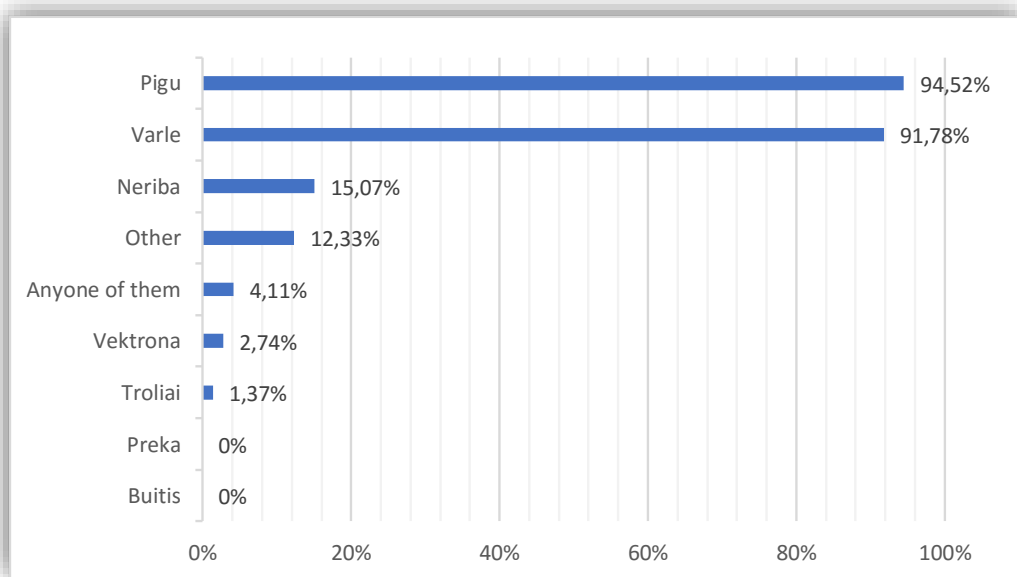


Figure 12. Lithuanian e-commerces known for Lithuanians (created by the author)

The 89% of the people that has been assessed had the capability to evaluate these e-commerces and the results will be analysed then. 75,30% have ever bought some products or services via Internet and the remaining 13,70% haven't, but despite that, they are able to evaluate these e-commerces.

Another aspect to be asked is the types of products that are most often purchased over the Internet. The survey has revealed a wide variety of products bought online (see Figure 13. Products and services bought through Internet). The most popular products are

events tickets and leisure: 69,10% of respondents bought them through Internet. This result is due to the no-need to touch and view in real. The second place of most bought products are computer or electronic articles (61,80%) and clothes, footwear and sports articles are also quite popular goods (56,40%). Nevertheless, it is a difficult task to choose this type of product and the appropriate size over the Internet. Other several goods and services are considered and their respective percentages are shown in the chart as well: books, magazines (41,80%), household goods (36,40%), hotels, restaurants reservations (32,70%), home appliances (20%), insurance, finance (16,40%), land or air passages (16,40%), films, music (9,10%), education, formation (9,10%), applications (7,30%). Films, music, education, formation and applications have the lowest percentages, so they are not usually bought through Internet. Films and music can be easily found for free on different websites or using television and radio. There are also several free applications available for computers and smartphones. These can be the causes of not buying often these kind of goods.

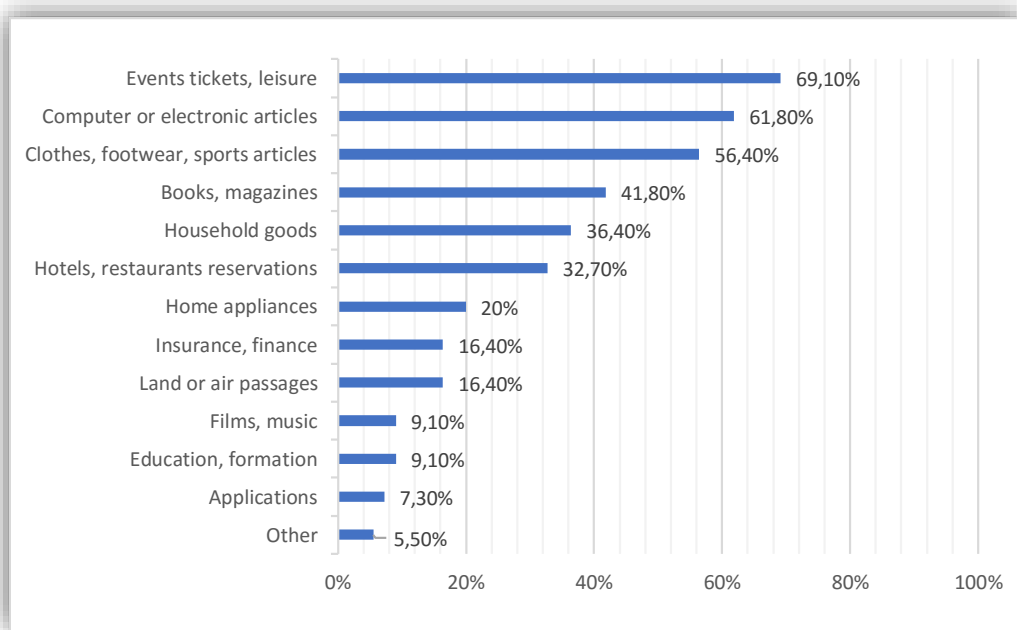


Figure 13. Products and services bought through Internet (created by the author)

It is important to know what motivates a person to buy through Internet and what rejects doing it physically in a shop. The respondents note that they are most often prompted to buy online in order to find better prices (65,75%) and due to ease and convenience (47,95%). Another reason is the lack of time (30,14%) and e-commerce allow purchasing without leaving home at any time of the day. 27,40% of respondents

resorted to e-commerces to find some products not available in typical shops. Usually, e-shops offer a broader range of products and it is also possible to quickly obtain information. All the reasons with its percentages are collected in Figure 14.

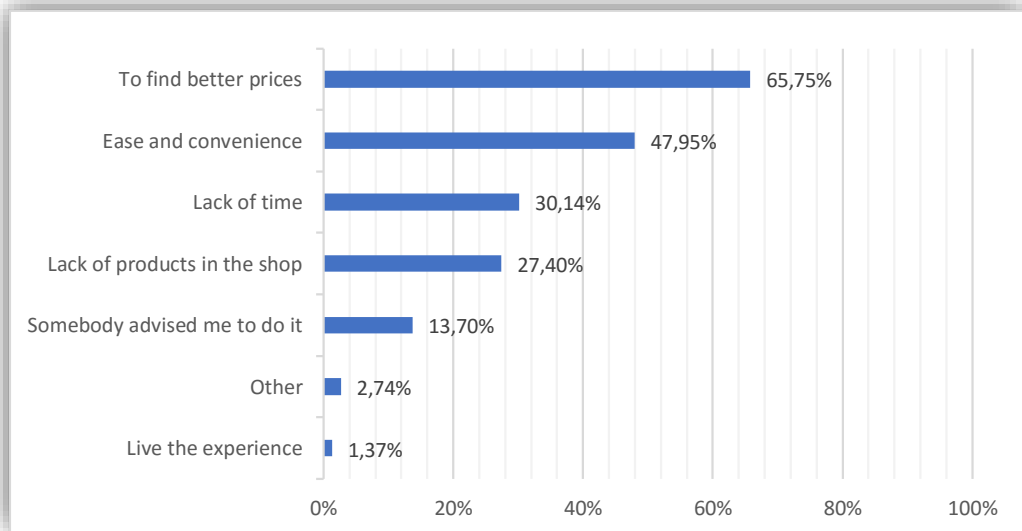


Figure 14. Motivations to buy through Internet (created by the author)

The survey enabled to identify that the 24,70% of respondents have never bought over the Internet. So it is interesting to analyse the reasons. The 50% of people answered that they need to have direct contact with the product before paying for it. The other reasons do not have such a high percentage: long delivery time (27,78%), distrust (16,67%), security (16,67%). Bad experiences of other people in e-commerces, no use of credit cards and difficultly in using the website are the other reasons with the lowest percentages. These differences of results, which are shown in Figure 15, can be caused by cultural differences, user experience when browsing the Internet and technological changes.

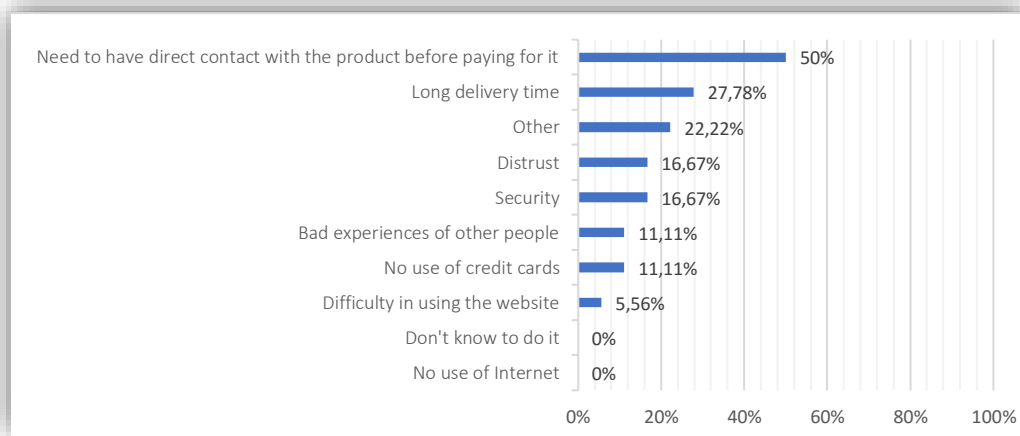


Figure 15. Reasons for not having bought anything through Internet (created by the author)

The evaluation of Lithuanian e-commerces has been done according to ten criteria: customer service (1), graphic elements, website designs (2), website utility (3), ease of use, navigation (4), convenience (5), variety of products (6), quality of products (7), order system (8), delivery time (9) and price of products (10). As it can be seen in the **Figure 16. Evaluation of Lithuanian e-commerces (created by the author)**Figure 16, people is satisfied about all the criteria mentioned. A few people were dissatisfied in some aspects and some qualified these as “Indifferent”. The global results are shown in the following chart (**Figure 16. Evaluation of Lithuanian e-commerces (created by the author)**Figure 16) and all the percentages of each satisfaction are collected in Table 9.

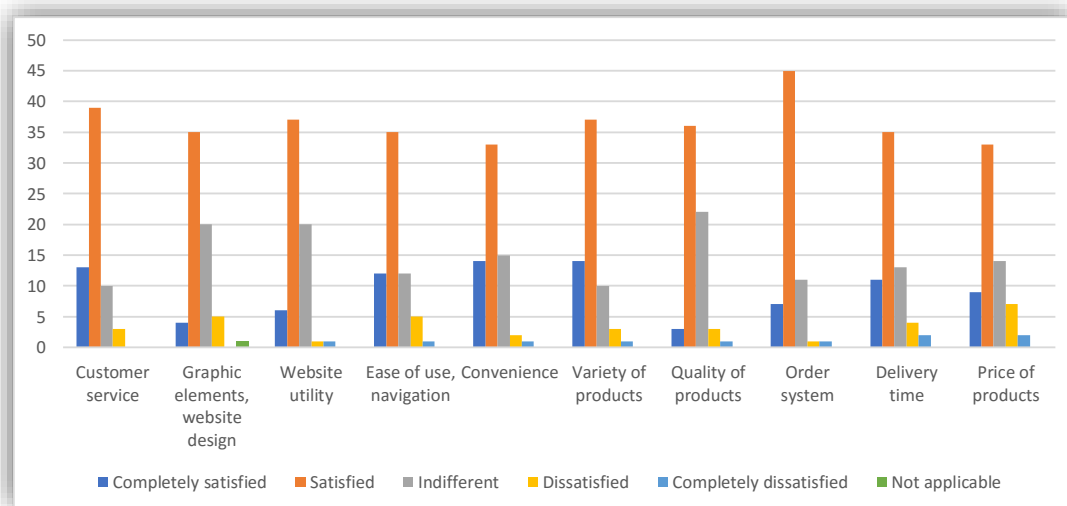


Figure 16. Evaluation of Lithuanian e-commerces (created by the author)

Table 9. Percentatges of satisfaction of Lithuanian e-commerces (created by the author)

	Completely satisfied	Satisfied	Indifferent	Dissatisfied	Completely dissatisfied	Not applicable
Customer service	20%	60%	15,38%	4,62%	0%	0%
Graphic elements, website design	6,15%	53,85%	30,77%	7,69%	0%	1,54%
Website utility	9,23%	56,92%	30,77%	1,54%	1,54%	0%
Ease of use, navigation	18,46%	53,85%	18,46%	7,69%	1,54%	0%
Convenience	21,54%	50,77%	23,08%	3,08%	1,54%	0%
Variety of products	21,54%	56,92%	15,38%	4,62%	1,54%	0%
Quality of products	4,62%	55,38%	33,85%	4,62%	1,54%	0%
Order system	10,77%	69,23%	16,92%	1,54%	1,54%	0%
Delivery time	16,92%	53,85%	20%	6,15%	3,08%	0%
Price of products	13,85%	50,77%	21,54%	10,77%	3,08%	0%

The assessment of e-commerce websites revealed the importance of improving some characteristics. In general, most people are satisfied with the e-commerces of Lithuania, but there are some features that should be improved in order to minimize the number of dissatisfied consumers.

The percentages of customer service enabled to identify that customer service of Lithuanian e-commerces is good. Provision of service customer before, during and after the purchase is very important. A good customer service experience can change the entire perception a customer holds towards the organization. It should be included as part of an overall approach to systematic improvement. The results shows that Lithuanian people is satisfied with graphic elements, website design, website utility, ease of use, navigation and convenience. These aspects are key point and very important in order to make e-commerce a success. Some people are not satisfied with the quality and variety of products. The order system has a good satisfaction between people. There are still people not satisfied and it can be caused by some difficulties during the process of ordering the products in the website. Delivery time is a feature that should be improved. The percentage of satisfaction is not low but still not that much high. Some delays can be the consequence of this little dissatisfaction of Lithuanian people. Finally, according to the price of products, it has the highest percentage of dissatisfaction.

3. CHOICE OF THE RIGHT SUPPLY CHAIN FOR THE E-COMMERCE

The research methodology followed to reach the purpose of the thesis was making two different questionnaires because nowadays, there is no information in the literature about which supply chain should be used for a certain e-commerce. The description of each questionnaire is explained below:

1. The main survey is addressed to experts in e-commerce and supply chain, in other words, people who studied extensively these topics and their specialization is focused on them (for example teachers of business universities or business schools). This survey provided the sufficient information to create the solution (see section 3.1). this questionnaire is composed by 12 questions, combining open questions, checkboxes and some grids.
2. The other survey is addressed to e-commerce companies. This survey enabled to know how the company works in terms of supply chain and what are their strategies (see section 3.2). this survey is composed by open questions, checkboxes and some grids and in total it has 15 questions.

3.1. Supply chain from the point of view of experts

The results of the main survey enabled to identify which kind of supply chain should be used in a certain area according to a concrete e-commerce and a mind map was created to show the results. In some cases, more than one supply chain is proposed. Experts also answered some other questions related to supply chain, problems and strategies to follow and all these characteristics according to their opinion and experience are also explained.

The mind map, which is divided in four figures, shows how should be the supply chain in the different areas of it according to some certain e-commerces. The four classifications of types of e-commerce, the areas of supply chain and the types of supply chain are listed and explained when it is needed below:

Types of e-commerces

1. Clothes, footwear, cosmetics and sports articles (see Figure 17)
2. Books, magazines and stationery objects (see Figure 18)

3. Home appliances and household goods (see Figure 19)
4. Electronic articles (see Figure 20)

Area in supply chain

1. Storage and inventory management
2. Reception and order management
3. Logistic activities (preparation, packaging...)
4. Transport and distribution
5. Management of incidents

Type of supply chain

1. In-house: activities are carried out by the company itself and it doesn't resort to any company services.
2. Outsourcing: activities are not carried out by the company and it has the need or prefers to resort to a company services specialized in some tasks. For instance, for large volumes of products is better to use outsourcing.
3. Combination: a mix between in-house and outsourcing in some cases is required, but this is the least typical type of supply chain.

Then, the proposition for choosing which type of supply chain for the different types of e-commerces is shown. In some areas, it is not possible to choose which type is the right one because according to experts, two options were correct.

In some areas, one option predominates for all types of e-commerce. For instance, management of incidents should be done in-house. It is not recommended to outsource all the management of incidents because brand image can be affected. On the other hand, outsourcing is the best option for transport and distribution. These cases and the others are shown in the two following pages.

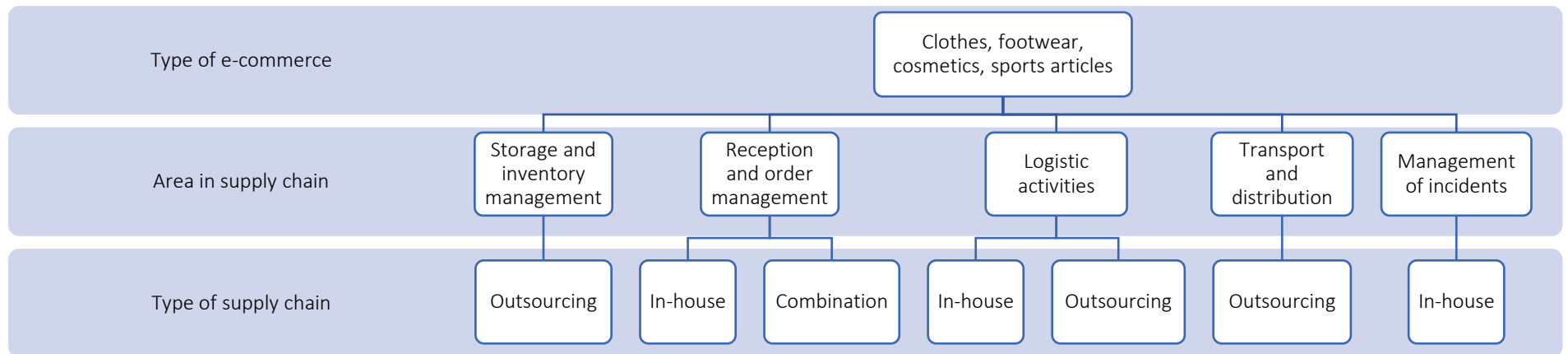


Figure 17. Supply chain model for e-commerce that sell clothes, footwear, cosmetics and sports articles

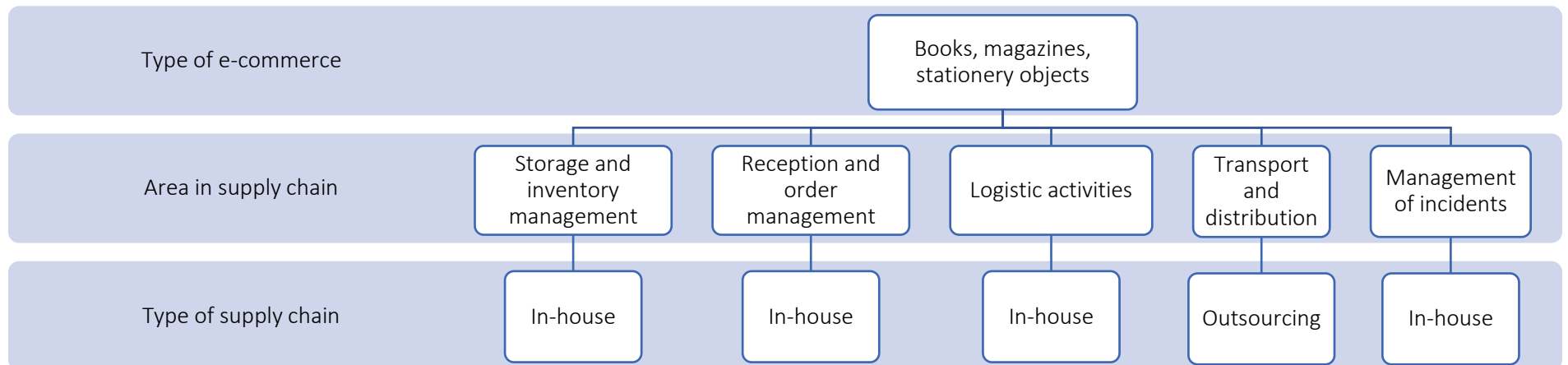


Figure 18. Supply chain model for e-commerce that sell books, magazines, stationery objects

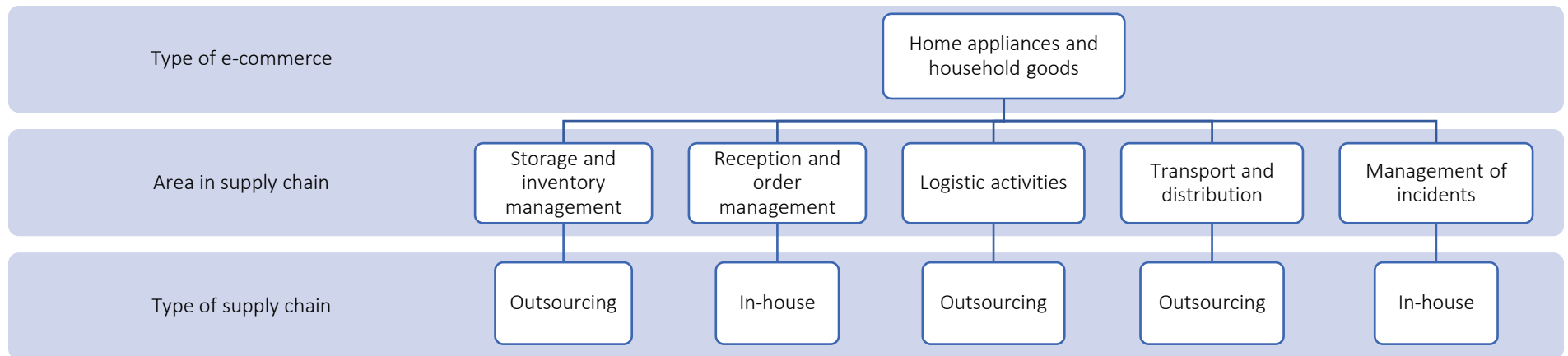


Figure 19. Supply chain model for e-commerce that sell home appliances and household goods

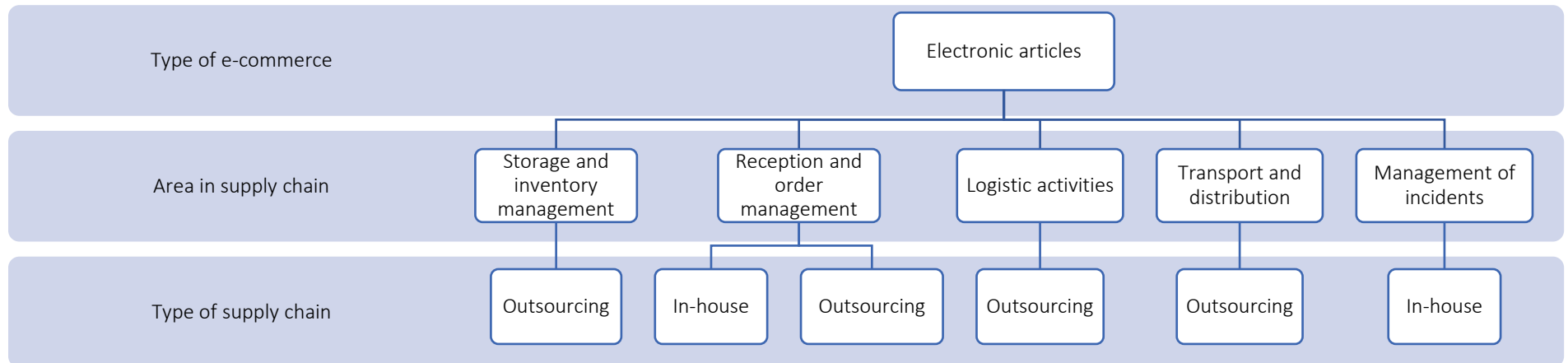


Figure 20. Supply chain model for e-commerce that sell electronic articles

In addition, thanks to some of the questions made in the questionnaire, experts expressed their opinion based on their experience about some features. Then, they are explained.

Experts were asked about how problematic are some areas in supply chain. The global results for each are shown in Table 10:

Table 10. Problematic of different areas in supply chain according to experts (created by the author)

Storage and inventory management	Reception and order management	Logistic activities	Transport and distribution	Management of incidents
Extremely problematic	Very problematic	Problematic	Very problematic	Very problematic

It is not always necessary to use a warehouse. However, experts recommend using warehouses to keep the stock of products in the following cases:

- Especially at low cost.
- Products which are not perishable, in other words, products that have a long duration.
- Products in which fashion doesn't influence.
- In an e-commerce that complements with offline, that is an e-commerce that also sells products in physical shops.
- Immediate delivery is an advantage or a very favourable point.

However, having stock is very complicated. It implies a very big economic and management problem. It depends on the sector and it is just recommended in case the e-commerce produces the products (manufacturers), when the e-commerce also sells products in physical shops or when deadlines give the company a competitive advantage. But, any material management that does not have an assured recipient is a focus of problems (expiration, obsolescence, losses, maltreatment...).

Experts consider that using distribution centres is necessary when the geographical location of consumers is atomized, lots of products must be sent to few destinations or sales are done through many countries.

Post-offices, transport companies and outsourcing of logistics are the typical ways of making shipments of products. But it doesn't exist the best way of making it. It is flexible because it depends on many factors such as the product itself, the cost of sending it, the destination, etc.

About which types of product delivery are the most efficient and least problematic, most of experts consider that delivery at home and also collection at a physical shop belonging to the e-commerce if it exists. Collection in a pick-up point outside the store and the carrier and delivery at transport's agency are less recommended.

These guides should be followed in order to have an efficient supply chain and the e-commerce will be a success. Consequently, consumer will be satisfied.

3.2. Supply chain from the point of view of companies

The results of the third questionnaire enabled to obtain information of three e-commerce companies that are addressed to national and international public. They provided information about their characteristics, the problems they experimented in some areas and the strategies they follow. These areas are storage and inventory management, reception and order management, logistic activities (preparation, packaging...), transport and distribution, and management of incidents.

The first one is an e-shop that sells swimwear and its value-added is that this e-commerce offers the possibility of customizing the colours, the patterns and the shapes of its products. This company considers that transport and distribution and management of incidents are a bit problematic. Sometimes, there are delays in deliveries and loss of packages and these aspects must be improved. However, other aspects such as storage and inventory management, reception and order management and logistics activities, they believe that are no problematic for this e-commerce.

This e-shop doesn't keep products in stock because customization doesn't allow to do it. It doesn't have any distribution centres. The e-commerce sends the products via post-offices or via transport companies and the delivery is at home. The strategy of the company according to the aspects previously mentioned are:

Table 11. Strategy followed by the first e-commerce (created by the author)

Storage and inventory management	Reception and order management	Logistic activities	Transport and distribution	Management of incidents
In-house	In-house	In-house	Outsourcing	In-house

The second e-commerce analysed offers a service. It consists in renting routers to have Internet connection everywhere during a certain period. After this period, the router must be returned. This company reflects that transport and distribution are not problematic. However, it considers that storage inventory management, reception and order management, logistics activities and management of incidents are a bit problematic. In general, the e-commerce believes that the whole process is complex, therefore it is constantly being improved.

This company has warehouses to keep its products (routers), so it keeps stocks and three distribution centres are used in the network. Any product is sent via post-offices. All the products are sent via transport companies and the delivery time is one day. For this reason, this company considers that the worst problem is that they need to rely on the delivery company for the arrival in time. The ways of delivering the products are the following ones: delivery at home, delivery at a transport agency, collection at a physic shop belonging to the e-commerce and collection in a pick-up point outside the store and the carrier. This e-commerce follows this strategy:

Table 12. Strategy followed by the second e-commerce (created by the author)

Storage and inventory management	Reception and order management	Logistic activities	Transport and distribution	Management of incidents
In-house	In-house	In-house	Outsourcing	Combination

The third and last e-commerce evaluated sells objects and spare parts for automobiles. The main problems that this company has are related to storage and inventory management. This e-shop considers that reception and order management, logistics activities, transport and distribution and management of incidents are not problematic.

This company use its own warehouses to keep the stock of products and it works with the stock of suppliers as well. It doesn't have any distribution centres. This e-shop sends products via post-offices or via transport companies. The delivery can be done in different ways: delivery at home, delivery at a transport agency, collection at a physic shop belonging to the e-commerce or collection in a pick-up point outside the store and the carrier. This company makes an exhaustive control with the process of distribution of merchandise. Their strategies are shown in Table 13.

Table 13. Strategy followed by the third e-commerce (created by the author)

Storage and inventory management	Reception and order management	Logistic activities	Transport and distribution	Management of incidents
In-house	In-house	In-house	Outsourcing	In-house

CONCLUSIONS

Based on all the analysis of e-commerce and supply chain, the research and the model that has been proposed, the following assumptions are identified.

Theoretical material in available information sources about e-commerces and supply chain has been analysed. E-business and e-commerce are different concepts: e-commerce is a part of e-business and e-marketing and e-logistics are key points in an e-business. Logistics problems appear when the commerce is online and some e-logistics solutions must be implemented. According to Lithuanian LPI, it shows that Lithuania must improve logistics system in their companies. Moreover, e-commerce models according to some classifications have been described and Business-to-Consumer is the most common model. E-commerce platforms should have some features to achieve a high quality and efficiency website of e-commerce and thus e-commerce can succeed.

The impact of e-commerce in the world has been analysed empirically. This allowed to notice that the number of people who buy and sell products or services through Internet is continuously increasing. In addition, some Lithuanian e-commerces have been studied. The satisfaction of these e-commerces is good but delivery time and the price of products should be improved.

Finally, a proposition for choosing the right type of supply chain for different areas of a certain e-commerce has been created. This has been possible thanks to some experts that contributed to it. These results, in other words, the model itself will be useful for any e-commerce who has troubles deciding which supply chain model should their company establish. Furthermore, three different e-commerces allowed to know how their supply chain is, explained the problems they found related to supply chain and detailed their strategy. It is noticed that these e-commerces, in some areas, follow the strategy proposed in the model according to their type of e-commerce, but not in all of them. Thus, they could change their strategy and focus on the considerations made by experts to improve their supply chain.

To sum up, the main objective of the thesis has been satisfactorily achieved and the necessary tasks to accomplish it as well.

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REFERENCES

1. Abd El-Aleem, A. K., Abd El-Wahed, W. F., Ismail, N. A., & Torkey, F. A. (2007). Efficiency evaluation of e-commerce websites. *World Academy of Science, Engineering and Technology*.
2. Arvis, J.-F., Saslavsky, D., Ojala, L., Shepherd, B., Busch, C., & Raj, A. (2014). LPI 2014 - The Logistics Performance Index and its indicators. *The World Bank*.
3. Arvis, J.-F., Saslavsky, D., Ojala, L., Shepherd, B., Busch, C., Raj, A., & Naula, T. (2016). LPI 2016 - The Logistics Performance Index and its indicators. *The World Bank*.
4. Barcelona Activa. (2015). *B2B: accede fácilmente a nuevos clientes y proveedores en los mercados electrónicos*.
5. Baršauskas, P., Šarapovas, T., & Cvilikas, A. (2008). The evaluation of e-commerce impact on business efficiency. *Baltic Journal of Management*. <http://doi.org/10.1108/17465260810844275>
6. Comercio Electrónico Región de Murcia (CECARM). (2015). ¿Cuáles son los diferentes modelos de comercio electrónico? Retrieved from <http://www.cecarm.com/>
7. de Oliveira Paegle, A. C. (2012). *Benchmarking on web technologies and a recommender system development for E-commerce*. Universitat Politècnica de Catalunya (UPC).
8. eB. (2012). Consumer-to-Administration (C2A) or Administration-to-Consumer (A2C). Retrieved from <http://ebusiness2016.blogspot.lt/>
9. Ecommerce Foundation. (2015). Northern B2C E-commerce Report 2015. *Ecommerce Foundation*.
10. Ecommerce Foundation. (2016). Global B2C E-Commerce report 2016. *Ecommerce Foundation*.
11. Estrada, C. (2016). Marketing digital. Ventajas y desventajas del marketing digital. Retrieved from <http://marketingd2016.blogspot.lt/>
12. Eurostat. (2016). E-commerce statistics. Retrieved from <http://ec.europa.eu/>
13. Eyerys. (2017). Types Of E-Commerce Models. Retrieved from <https://www.eyerys.com/>
14. Fajardo Farje, O., & Chuquiyauri Velásquez, R. (2009). E-business. Retrieved from <https://es.slideshare.net/>

15. Fisher, M. (1997). What is the right supply chain for your product? *Harvard Business Review*. <http://doi.org/Article>
16. Guseva, N. (2011). *Looking for the e-commerce quality criteria: different perspectives*.
17. Khurana, A. (2017). E-commerce supply chain strategy. Retrieved from <https://www.thebalance.com/>
18. Kont, J. (2011). ¿Qué es emarketing? Definición y concepto más allá del Click. Retrieved from <http://kont.pro/>
19. Lipinski, K. (2012). A2B (administración de negocios). Retrieved from <http://www.itwissen.info/>
20. Luiz Escoriza, L. (2014). *Analysis, design and development of a web-shop template using SPHERE.IO e-commerce platform*. Universitat Politècnica de Catalunya (UPC).
21. Mendes dos Reis, J. G., de Oliveira Costa Neto, P. L., Alves Fusco, J. P., & Teixeira Machado, S. (2014). Supply chain strategies in the context of an e-commerce chain (e-chain). *Independent Journal of Management & Production*. <http://doi.org/10.14807/ijmp.v5i2.148>
22. Nieto Melgarejo, P. (2015). *Nociones generales sobre el comercio electrónico*.
23. Observatorio Regional de la Sociedad de la Información. (2008). *E-logística. La problemática de la logística en el comercio electrónico*.
24. Oracle. (2011). *The Top 10 Technical Considerations for Evaluating E-Commerce Platforms*.
25. Pierce, J. (2014). Los 5 tipos de comercio electrónico. Retrieved from <https://es.shopify.com/>
26. Piñedo Fajardo, S. (2011). E-commerce vs E-business. Retrieved from <https://es.slideshare.net/ednalasso/e-commerce-vs-ebusiness>
27. Quondos. (2015). Qué es el dropshipping y 10 consejos para afrontarlo. Retrieved from <https://www.quondos.com/>
28. Ramalhinho-Lourenço, H. (2005). e-logística.
29. Ribas, I. (2016a). Diseño de la Cadena de Aprovisionamiento. *Universitat Politècnica de Catalunya (UPC)*.
30. Ribas, I. (2016b). El producto y la cadena de suministro. *Universitat Politècnica de Catalunya (UPC)*.
31. Rodríguez, J. H. (2012). *Comercio electrónico*. Retrieved from

<https://es.slideshare.net/>

32. Soriano Ibáñez, M. (2016). Introducción al comercio electrónico. *Universitat Oberta de Catalunya (UOC)*.
33. Telepieza. (2015). Modelos actuales de comercio electrónico por Internet (B2C, B2B, C2C, C2B y M2B). Retrieved from <https://www.telepieza.com/>
34. Tobon, L. (2009). E-marketing. Principales ventajas y desventajas. Retrieved from <http://finalemarketing.blogspot.lt/>
35. Vasiliasauskas, A. V., & Jakubauskas, G. (2007). *Principle and benefits of third party logistics approach when managing logistics supply chain*.